DEPARTMENT OF DEFENSE BLOGGERS ROUNDTABLE WITH SPECIALISTS IN UXO AND ROBOTICS FROM U.S. ARMY ENVIRONMENTAL COMMAND VIA TELECONFERENCE TIME: 10:00 A.M. EST DATE: WEDNESDAY, FEBRUARY 11, 2009

(Note: Please refer to www.dod.mil for more information.)

LINDY KYZER (Army Public Affairs): Hi, this is Lindy Kyzer with the Army Public Affairs. Is this Neal?

NEAL SNYDER: Yeah, this is Neal.

MS. KYZER: Great.

MR. SNYDER: Neal Snyder with the Army Environmental Command Public Affairs Office. We're here in El Paso, Texas with some of the people who worked on the UXO robotic technology demonstration yesterday. I'm going to go around the room and introduce everybody, starting with Kim Watts, and everybody introduce yourself and say who you are.

KIMBERLY WATTS: Sure, hi. This is Kimberly Watts. BONNIE PACKER: Bonnie Packer. I'm with the Army Environmental Command as well.

GENE FABIAN: Gene Fabian. I'm with the Aberdeen Test Center.

BOB SELFRIDGE: This is Bob Selfridge. I'm the chief geophysicist at the Huntsville Army Corps of Engineers.

MS. KYZER: Great. Well, thank you all for you time and for taking the time to join us on the line. We have with us Jake Bruel (sp) and Sean Gallagher. We'll take their questions in just a minute, but first I wanted to turn it over to you all for some opening remarks. Possibly you could walk us through what happened yesterday, tell us how that went, and tell us more about what you're doing there.

MS. PACKER: Sure. Yesterday we did a robotics demonstration of several pieces of equipment that will help us to hopefully mitigate the costs associated UXO clearance and removal of, of course, of the UXO for the range modernization process that G3 is responsible for.

The day went -- in my opinion went extremely well. We looked at several different pieces of equipment. I think the important thing, though, to say, too, is that this particular demonstration is only one program or project out of a larger project that we're trying to capture -- a lot of different efficiencies that hopefully we can implement in the range clearance -- or in the range modernization program.

Does that help?

MS. KYZER: Yeah, that's perfect. Thank you very much for that. With that we'll go ahead and turn it over to questions. Jake, did you have a question?

Q I don't, actually. I'm kind of just here to see how this Bloggers' Roundtable thing works. (Laughter.)

MS. KYZER: Okay.

Q Well, I'll go ahead and start asking some questions, then. This is Sean Gallagher, senior contributing editor to Defense Systems and blogger for both Defense Systems magazine and for the PacketRat.com.

So I guess the first question I have is can you talk about what the robotic platforms were that were evaluated a little bit?

MR. FABIAN: All right, we've evaluated two basic platforms the Air Force Research Lab has developed: the ARTS, which is -- of course I would draw a blank on what ARX stands for.

MS. WATTS: Automated Robotic -- is that right? MR. FABIAN: Hold on a second.

MS. PACKER: Yeah, sorry. We just call it the ARTS. (Laughter.)

(Cross talk.)

MR. FABIAN: -- the acronym. We're just so used to using that acronym on it. It resembles a Bobcat --

Q Okay.

MR. FABIAN: -- just so you can picture it in your mind.

MR. SNYDER: I'm sure we can supply you with a picture of what this thing looks like.

MS. PACKER: Oh, absolutely.

Q Okay.

MR. SELFRIDGE: It was the one with the brush-cutter on it yesterday, right?

MS. WATTS: They have several different attachments that they put on it to do different things.

MR. FABIAN: Yeah, basically the basic system, the Bobcat-like system is remote operated -- has been outfitted for remote operation, and they have a number of attachments that can be added to it -- you know, your typical brush cutters, a backhoe, you know, buckets, different things like that, that can be placed on there.

We had two of those systems in the field. We were using them basically as brush cutters for the most part. We're also using them to push some of the dirt around as it's being dug up -- as it's being sifted by the other system, the automated excavator. And that is a remote-operated tracked excavator. We demonstrated two attachments on that -- an 8,500 pound magnet, electromagnet that's better used in scrap yards to move, you know, cars and metallic scrap around.

And we use that to try to pull the UXO out of the soil and other metallic debris out of the soil. And also a rotary receptor bucket -- a three-cubic-yard bucket that's been screened for, in our case, 20 millimeter -- less than 20 millimeter debris. And what you do with that is you pick up a bucket of soil, it spins, sifts out the soil, and they can dump the spoils off to the side for further processing to remove any metallic debris from the rock spoils.

We also have a third unit that we've demonstrated, and I guess I'll let Bob talk about that a little bit. It's their AMRADS unit, which is an autonomous unit that is used to tow or -- (inaudible) -- be it a physical survey or -- MR. SELFRIDGE: And that unit is slightly different in that it is set up for autonomous operation, meaning that we plug in the outer boundaries of an area that we will want geophysically surveyed.

We typically geophyisically survey an area before we attempt the remediation process, as well as successive stages after a remediation has been performed to identify whether the ordnance has been removed from the site or not, or how well the performance is done.

By autonomous we set in those outer boundaries of the area we want surveyed. We design an path, and basically we take the unit, the AMRADS unit that is towing our geophysical time domain, electromagnetic detector system behind it, and set it to follow the precise path that we've plugged into it so we get complete coverage of the area that we're surveying.

So in that respect we'll end up with a geophysical map that identifies where all the metallic anomalies are in the area being surveyed, both before and after removal operations.

Q Okay.

MR. FABIAN: The ARTS unit and the automated excavator, they are both remote operated. They currently do not run autonomously like the AMRADS unit, but the next phase of development is to -- (audio break) -- systems autonomous operation.

Q Okay, so how are you getting -- they're remote operated. How do you control where they move to to do what they're doing in terms of precision required for removing unexploded ordnance? Is there a -- do you have a data link -- a geographic database that you're using to steer them onto target, or is the operator just eyeballing them on to where they're supposed to go to?

MR. FABIAN: The operator operates them by remote. The controls are radio frequency controls. There is a camera system on things that they operate visually via camera.

Q Okay.

MR. FABIAN: Like I've said, the next phase -- with the ARTS system they're currently configured so that they can be modified for autonomous operation with GPS coordinates put into them, similar to the AMRADS. So that's kind of the next phase for that. There is a few challenges there with, you know, being able to -- you're not able to -- the equipment is not able to identify obstructions in its way that, you know, if they're not already preprogrammed in, you know, they would run into and possibly damage the equipment. But right now everything is radio frequency controlled and remote operated, and it's a visual operation.

Q Okay. Okay. Now, you said these were developed by the Air Force Research Laboratory?

MR. FABIAN: Yes, sir, that's correct.

Q Okay. Were they based on any existing robotics platform that's in the inventory, like anything from My Robot (ph) or anyone like that?

MS. PACKER : No.

MR. FABIAN: No.

MS. PACKER: They're actually off-the-shelf technologies, the platforms themselves, fitted with the robotic package.

Q Okay, so you basically robotized the Bobcat and extractor and things like that and you're just -- and the surveying robot is essentially -- I mean, pardon me for getting -- for making -- simplifying this to the point of -- but basically it's set up like a giant Roomba. (Laughter.)

MR. FABIAN: Good explanation. The difference is, as we mentioned, you know, all the systems, including the AMRADS, can be tele-operated. We use RF as well as fiber optic cable for those units. But the AMRADS, instead of like the Roomba -- the Roomba actually does kind of a random pattern.

Q Right.

MR. FABIAN: We actually use a very precise pattern. And if you've ever been at the ice skating rink and seen them clean the ice, with what we call the Zambonis --

Q The Zamboni, right.

MR. FABIAN: We typically use that Zamboni pattern to make sure we get complete coverage. And the data for our geophysical detection devices is very clean because it's very precise, fast; it tells you where to go. It doesn't waddle and wander all over the site like a human being would be, so we actually get much better data quality by using a robotic system.

Q Okay. And so the -- so I take it then since these are off- the-shelf that have been put in -- had a robotics package put in them, there's no commonality with any of the systems that say -- the robotic systems that are being developed for a future combat system or anything like that. MR. SELFRIDGE: No, the reason is for parts and maintenance. We had to -- this was designed with the military in mind. When they needed spare parts, they didn't want to have anything specially manufactured. They want to be able to go just a commercial off-the- shelf company and say, send me these parts.

Q Okay.

MR. SELFRIDGE: They need maintenance on it. There's people that are trained in it. There's not a big retraining for the mechanicals, I would say, of the systems. But, you're correct. What they did do is figure out how to put the robotic packages on them for command and control, as well as for the data transfer back to the operators. And of course all these systems have what I'll call a panic switch. It's really, you know, an emergency stop switch, so there's still a man in the loop just in case anything would go wrong or somebody out in the middle of these ranges in the middle of nowhere somebody would run across in front of it, you know, they can hit the panic switch and stop everything.

MR. FABIAN: I think, you know, as far as any custom built or things unique, the only thing I've seen when visiting the AFRL site is they do build their own motherboards for the computer controls of the system. But even that I think is going toward -- you know, the basic construction equipment itself is going towards digital control, so now they're using a -- (inaudible) -- systems that are just off-the-shelf -- (inaudible) -- type things. So their ability to remote-operate a piece of equipment now has gotten a lot easier. You know, it's something that's done quickly and fairly inexpensively, without a lot of -- in earlier versions there was a lot of custom building for a remote package. Now it's almost completely off-the-shelf.

Q Is there an interest in any of these for use in EOD applications overseas, removing unexploded ordnance, say, in Iraq?

MS. PACKER: Yes.

MR. FABIAN: I believe the Air Force EOD currently uses them. They use them both stateside and I believe overseas to support our EOD operations.

MS. PACKER: I think that was the original funding mechanism that was utilized was actually for road clearance or -- they call it something. It's like a road clearance.

MR. SELFRIDGE: Route clearance?

MS. PACKER: What was it?

MR. FABIAN: Route clearance.

MS. PACKER: Route clearance. They call it route clearance. Q Route clearance, right. Okay.

MR. SNYDER: Not mine clearance.

Q So for dealing with IEDs and things like that.

MS. PACKER: Yeah, which is exactly what we're doing. We're just using it on the application in the range construction project because a lot of the Army -- new ranges are being constructed on old ranges where, you know, munitions have already been fired.

Q Right.

MS. PACKER: So we're doing the same thing, just using it in a slightly different application, but for the same purpose: clearing UXO.

MR. FABIAN: Stateside the Air Force has been using them for a few years to support some of the range maintenance activities. They will use them to clean up something around their targets when they need to go out and do maintenance on their targets and things.

What makes our testing here at Fort Bliss different is that we're trying to apply this equipment to support of range construction -- future range construction activities, which requires a lot larger areas to be cleared. It's basically stretching -- you know, expanding the -- we're looking at what's going to work and what we can scale up to address the larger capacity -- or the larger volumes of soil that might be required to be processed for a range construction activity as opposed to some of the smaller-scale range maintenance activities that they've typically done with this equipment.

Q Okay. So you might upgrade the equipment based on from Bobcat to Caterpillar?

MR. FABIAN: Yes. I mean, we need to -- you know, we need to definitely look at scale-up for the equipment, so instead of being able to -- like the rotary receptor bucket in the case here at Fort Bliss where we were trying to screen out 20-millimeter explosive rounds from the soil. That's the smallest they've ever tried to screen out. Usually it's -- at other locations they've screened out larger rounds, like 105s and 60- or 80-millimeter mortar -- something pretty big.

Q Right. Right.

MR. FABIAN: In this case we're going down to 20 millimeters. It takes a lot longer for the sieve to be able to sift down to that level because just the holes in the screen are smaller. You have to spin it longer. So our production rate is down to, you know, 100 to 150 cubic yards per day, basically, using that rotary receptor. The site here would be similar on other ranges where we have these small munitions. What we need to do is try to scale up, you know, sifting operations to where we can handle, you know, hundreds of cubic yards per hour, be able to afford range construction activities.

MR. SELFRIDGE: So one of our tasks that became very evident during this demonstration is everything from the brush cutting to the geophysical detector rays that we place out there in the equipment to tow them, to -- all equipment, everything has to be much larger-scale for these very large, vast areas that we have to clear with a very limited amount of time to keep on schedule that the range's construction is designed for, set up for.

MS. PACKER: There are, though, some applications where the equipment is -- you know, the equipment the way it stands right now is definitely applicable. So there's two things that we're doing. You know, we wanted to demonstrate to make sure that the equipment was actually working the way we were hoping that it would work. It did. Yes, definitely for smaller areas. Yes, we need to scale up for the larger areas, larger ranges, but, you know, there are applications for it right now in the whole process.

MR. SELFRIDGE: Definitely.

MS. PACKER: So --

MR. FABIAN: Yeah, we're looking at -- I guess in the UXO removal equipment and the brush cutting we're looking at basically two things: removal efficiency -- you know, what percentage of the metallic anomalies can we successfully remove with this type of equipment? And the other is production rates, and what -- you know, we wanted to identify what scenarios their current capabilities would support, as well as what we needed to do in the future as far as scale-up to support our large range construction activities.

Q Okay.

MS. KYZER: Okay, are there any other questions?

MS. WATTS: One of the questions we did receive in e-mail, and I think you've touched on it, but I'll go ahead and ask it, is relative to other equipment that exists and could do the same thing, how is this robotic technology, or how are the applications you're using now better or more efficient, and was that one of the things you were looking to demonstrate yesterday?

MS. PACKER: I don't know that there are other --

MR. SELFRIDGE: There is -- well, at least on the geophysical end there's --

MS. PACKER: Maybe, okay. MR. SELFRIDGE: -- there are at least two other robotic systems that have been working with the self-operated, semi-autonomous and autonomous systems. One is a very large system. Then there's a second system that's actually a small system purposefully designed for that. Both these systems were really worked out of university -- CMU, Carnegie Mellon University, a red (ph) zone, ICHOC (ph) geophysics, and a very large system that they worked on in a desert environment. And then Auburn University has worked also with us, with the Army Corps of Engineers, a smaller system which AFRL also does have a system. It's a four-wheel Segway system.

MS. : (Inaudible) -- 103?

MR. SELFRIDGE: So it's very small, and it's made for small jobs to be able to be shipped on the area. But for capabilities, the systems we demonstrate here right now are pretty well advanced.

MR. FABIAN: On the brush cutting and UXO or metallic debris or removal, there's not much available in terms of automated equipment or remote operated equipment to do this. Actually, other than -- I think there might be one or two companies that have, you know, a single unit that, you know, they basically can go out and demonstrate. There is nothing available that's going to be put out and operated at a full production level to support Army -- (audio break).

The other competing options for brush removal or UXO removal is, first of all, hand-digging or hand-cutting of the debris, which is very expensive yet. And the second option would be use of armored equipment that, you know, are operated by man in the field, but you have limitations on the size of rounds that you can armor against. Typically the larges round you could armor a piece of equipment and then safely operate would be like a 75-millimeter round. Above that, you have problems not only with the frag generated, but also the pressure

weight would kill somebody in there. The 75-meter will knock them around pretty good too, so you really don't want to do that. (Laughter.)

MR. : They'll notice it.

MS. : They'll know they hit it.

MR. FABIAN: Yeah, so, you know, there's limitations on what we can do with man-operated armored equipment. That is currently used out there in areas where they know what is on or in the ground, but in most of these Army ranges where, you know, anything and everything are typically shot out there you could be running across 20 mills and hit a 105 or a 155 out there. You never know what you're going to hit, and so there's always a risk associated with using that armored equipment.

The remote operated equipment that we're demonstrating, you know, helps us remove that risk because the operators are outside of the blast zone. MS. WATTS: I just wanted to say that one other thing that our testers at ATC is doing -- Gene -- he's documenting cost savings for the military in terms of how much the standard method for doing the range construction costs versus if you use the systems that both Bob Selfridge was talking about and that Gene Fabian was talking about, and that will be part of the analysis.

MR. SELFRIDGE: And an additional part of that analysis is how much we can reduce schedule by, because, like I said, the range construction schedule is very accelerated and very ambitious.

So we've got to figure out ways to do a fast schedule. So this is one of the methods that we're looking at to be able to do that.

MR. FABIAN: Currently, you know, we have a lot more area -- we need -- we only have a limited supply of UXO technicians that go out and clear these areas. So our ability to do this by the traditional, you know, tag and flag, hand-dig these items is very limited.

MS. PACKER: And the cost of that is extremely high to the military -- extremely high. So, you know, one of the objectives of the program is to see if there is a way that we can decrease the costs that are associated with that.

MS. KYZER: Okay, great. Are there an final questions?

Q I guess I just have one quick follow up on that last question about particularly how you're going to handle removal of types of ordnance that may not -- to go back to the Aberdeen situation, you've got a lot of ordnance there that is very, very old, and some of it is non-explosive. Are you putting any sort -- or looking at any sort of solutions there in robotics to sense for, say, if something you're pulling out of the ground has got mustard gas or something like that in it?

MR. FABIAN: At this point, no, we haven't -- no, this equipment is not equipped with sensors or anything that detect like a gas leak or something if we came across a chemical round. In its current configuration, the way we operate, if, you know -- if the operator is seeing something that they recognize, you know, typically you shut down and, you know, have a field team that would have to go out and investigate and find out what it is. And then if that's the case, then we would take appropriate actions to handle the -- you know, any kind of chemical round that might have been found, and that may include, you know, use

of that remote-operated equipment as part of that operation. But that's still going to be, you know, rather unique and has to be addressed on a case-by-case basis.

Q Right, okay. All right, thank you very much for that and for your time this morning.

MS. WATTS: You're welcome. MR. SELFRIDGE: And I would just warn you. We mentioned the term "Bobcat" just to give you an image in your mind.

Q Understood, not the brand name. I understand.

MR. SELFRIDGE: That's not the brand name, so -- (laughter).

Q I won't type "Bobcat."

MR. SELFRIDGE: Okay, that sounds good. I know there could be one underneath it, you know, underneath the skin, but -- (laughs).

MR. FABIAN: Yeah, I was looking through my notes. I know I was -- actually I wrote all this stuff down the other day when I was drafting some sections of a report, and I'm just drawing a complete blank. The ARTS -- I mean, we could get back to you with that information or you could probably just Google ARTS and Air Force Research Lab and you'll get the --

MS. WATTS: The acronym.

MR. FABIAN: -- the definition of that acronym.

(Cross talk.)

Q -- the Bobcat just by looking at it.

MR. FABIAN: Yeah, it's a similar type system with similar load capacities.

Q Understood. So it's a comparison, not the actual equipment. I understand that.

MS. KYZER: Okay, if there aren't anymore questions, I will turn it back over to the team over there. Do you have any final remarks or anything that we didn't touch upon that you'd like to leave us with, or --

MS. PACKER: I guess the main thing that I'd like to say is that it is a demonstration, so we're really testing, trying to evaluate if the equipment works, and so it's in the infancy. You know, the other pieces of equipment that you were asking about -- you know, are there any possibilities for looking at chemical round and those kinds of things -- that is way off for us anyway, for this particular program. So just keep that in the back of your head as you're thinking -- you know, as you're writing or, you know, thinking about the program in general. You know, it's in its infancy and we're in the process of seeing if it's applicable to the range construction, range modernization program.

MR. FABIAN: And as far as the range modernization program goes, I can't say we've never run across, you know, chemical rounds at a training installation. There are occasions where we do, you know, something at a monument -- (inaudible) -- during World War II or World War I, but, you know,

the chemical issue is primarily something that's associated with the test centers, and in those cases there's not a big range modernization program associated with those.

MS. PACKER: Not a -- (inaudible).

MR. FABIAN: Our range program is focused on the training ranges and developing the new training assets needed to support the troops. So that's not a problem that we expect to run across too often out here.

MS. PACKER: And there definitely are procedures and protocols in place, you know, that would take care of that, and that's not -- it wouldn't be for us to deal with.

MS. KYZER: Okay, well, again, we're right at our 10:30 stopping point, so thanks so much, everyone, for your time. Thanks, Jake and Sean, for joining us, and thank you to all of our speakers who talked about the UXO robotics. We'll be interested to know what comes of the report and excited to send out some photos of the demonstration yesterday to those who were on the line today. So thank you again, everyone.

END.